

# Probing the Needs of Injecting Technical Communication in English Module in Indonesia Railways Polytechnic: A Students' Perspectives

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**Abstract.** For employment, industries want recent graduates to have strong technical communication abilities. Therefore, it is important for engineering organizations to have competent technical communicators. As a result, this study looks at how Indonesian polytechnic engineering students assess their own technical communication competency needs in terms of knowledge, abilities, and attitudes toward technical communication in English. A survey on students' perceived needs for technical communication skills received responses from 85 diploma students in various engineering courses at a polytechnic. The study's findings showed that the students' knowledge and abilities about technical communication in English were low intermediate (mean > 3,5 score). In comparison to knowledge and attitudes about technical communication in English, skills in technical communication in English had the lowest mean score. This suggested that the pupils lacked technical English communication abilities. Despite this, the study's findings indicate that students understood the importance of technical communication skills for their future careers. Because need analysis is a continuous process for identifying learning needs, this study has shown that it is worthwhile to review the current needs of the polytechnic engineering students since students' responses could serve as a basis for the improvement of the classroom materials. Finally, this study has recommended that technical communication courses be included to the polytechnic education system since they are crucial for employment in a variety of fields, including engineering.

Keywords: Technical Communication Competency, Need Analysis, ESP

## 1. INTRODUCTION

The topic of graduate employability has garnered considerable attention in the field of education due to its role as a key indicator of the quality of educational institutions and even nations (Nauta et al., 2009). This is due to the ideal scenario where there exists a harmonious relationship between higher education institutions and the workforce. The continuous growth of this field necessitates researchers to engage in detailed investigations, leading to a constant influx of new publications and research. According to Holmes and Miller (2000), empirical evidence has

demonstrated that curriculum alignment has a significant role in facilitating the acquisition of advanced skills that are relevant to the workforce. This statement posits that there is a need for alignment between the curriculum and the workforce, with a focus on incorporating practical aspects of the learning process. This alignment should aim to provide students with advanced skills that are in line with the demands of the industry markets, thereby enhancing their employability.

According to Saputra (2015), businesses in Indonesia place a high level of importance on certain talents when hiring graduates from engineering colleges/schools. In addition to work-specific capabilities, the study revealed that foreign language proficiency (62.8%) and communication abilities (61.6%) were among the most sought-after skills by employers. Nevertheless, the findings of the user survey carried out by the Indonesian Railways Polytechnic in Madiun (Politeknik Perkeretaapian Indonesia Madiun, 2021) reveal a discrepancy between the identified industry requirements. The poll conducted by the user assessed seven essential qualities that alumni should possess. These skills include ethics, job-specific expertise, teamwork, information, and communication technology (ICT) proficiency, self-improvement, foreign language proficiency, and communication abilities. However, the findings indicated that foreign language acquisition (70.9%) and communication skill (74.4%) were ranked as the lowest two rating factors among the seven included.

The introduction of technical communication skills is essential for addressing this matter. Technical communication (TC) is a style of communication that focuses on the aim, substance, and context of the message to efficiently convey information within a professional setting (Lappalainen, 2010; Rus, 2015). The significance of training students for genuine communication in industry has been emphasised in earlier studies (Lappalainen, 2010; Rus, 2015).

In a recent study conducted by Friess and Boettger (2021), it was discovered through a quantitative analysis that areas pertaining to communication strategy and collaboration have the potential to facilitate the development of academic-industry partnerships in the future. In addition to this, several research have examined the topic from an educational standpoint. The research findings indicate that the TC curriculum holds significant importance in the realm of higher education, as evidenced by its recognition and adoption in several countries like the United States, the United Kingdom, Germany, Russia, Australia, Japan, and South Korea (Ding, 2018; Rus, 2015). Engineering students in these nations received instruction in both English oral communication skills and technical communication skills. Hence, to address the aforementioned challenges, the Technical Communication Pedagogical Model (Jamaludin et al., 2020) was put out as a potential framework for the development of a suitable English for Specific Purposes (ESP) Module for the Indonesian Railways Polytechnic.

Therefore, it is imperative to consistently enhance the curriculum design of engineering courses to enhance the proficiency of technical graduates in terms of employability skills (Shekhawat, 2020). It is unsurprising that language and communication abilities are regarded as highly valuable employment skills. Education and skills survey results conducted by the CBI (2013) showed that nearly three quarters (72%) of businesses say they value foreign language skills among their employees, particularly in helping build relations with clients, customers, and suppliers (39%) and one in five firms (21%) is concerned that weaknesses in foreign language proficiency are losing them business or is uncertain whether this is happening.

According to Feng (2015), the current approach to English teaching primarily emphasises the acquisition of language grammar, while overlooking the development of students' practical English skills. These practical skills encompass various areas, including the ability to write technical reports, deliver seminars, provide product instructions, analyse production processes, analyse charts, and interpret statistics. Furthermore, Feng (2015) has highlighted the challenges faced by manufacturing students enrolled in vocational colleges, particularly in the realm of technical communication (TC). These challenges mostly manifest in their spoken English proficiency and their ability to effectively address work-related issues. The similar finding was also seen by Yang et al. (2018). This study aims to solve the existing vacuum in the literature by investigating the students' opinion on the implementation of the viable Technical Communication Pedagogy Model at Indonesian Railway Polytechnic.

## **2. METHOD**

The survey instrument comprised a combination of open-ended and closed-ended questions, divided into two sections: (1) part A and (2) part B. Part A is designed to gather information about the respondents' profile. Part B consists of three sections, each including 18 closed-ended statements that assess technical communication proficiency. These portions specifically evaluate knowledge in technical communication, abilities in technical communication, and attitudes towards technical communication. The items in section B were structured using a five-point Likert scale, encompassing the response options of "Strongly Disagree," "Disagree," "Moderately Agree," "Agree," and "Strongly Agree." Each choice was assigned a numerical value ranging from 1 to 5. The concept of reliability pertains to the degree of consistency exhibited by a measurement device. Cronbach alpha ( $\alpha$ ) is widely cited as a reliability estimate in the language testing field (Brown, 2002). The Cronbach alpha ( $\alpha$ ) coefficient is a statistical metric that assesses the internal consistency of a test, scale, or questionnaire. It is a numerical number that ranges from 0 to 1. The concept of internal consistency pertains to the degree to which all the items inside a measurement instrument assess the same underlying construct or concept (Cronbach, 1951).

A preliminary investigation was undertaken prior to the commencement of this study to ascertain the instrument's dependability. The findings from the pilot test indicated that the Cronbach Alpha ( $\alpha$ ) coefficients for knowledge in technical communication, skills in technical communication, and attitudes towards technical communication were 0.75, 0.93, and 0.81, respectively. De Vellis (2012) posits that Cronbach alpha ( $\alpha$ ) levels over 0.7 are deemed acceptable. Hence, the obtained alpha ( $\alpha$ ) values provide evidence of the instrument's reliability in the present study. A formal request for authorization to conduct research at Indonesia Railways Polytechnic in advance of data collecting. The researcher personally gave the questionnaires to the respondents. The acquired data were inputted into the SPSS (Statistical Package for Social Science) software. Descriptive analysis was employed to analyse the data, with the aim of calculating the mean score and standard deviation values pertaining to students assessed technical communication competency demands.

## **3. RESULT**

The findings of this study indicate that, from the perspectives of the students, majority had mean scores below 3.50, Table 1 summarises students' perceived technical communication proficiency in terms of knowledge and abilities. This finding contradicted the initial research purpose of the present study. The results indicated that the students exhibited a moderate level of agreement (with mean scores below 3.5) regarding their proficiency in technical communication in the English language. In terms of mean scores, technical communication skills in English were found to have the lowest ranking (mean=3.41) when compared to knowledge in technical communication (mean=3.42) and attitudes towards communication in English (mean=4.04). The findings of this study indicate that Table 1 provides a summary of students' perceived technical communication competency in terms of knowledge and abilities, as perceived by the students themselves. Most of these perceptions were found to be below the mean scores of 3.50. This finding is in opposition to the primary research purpose of the present study. The results indicated that the students exhibited a moderate level of agreement (with mean scores below 3.5) regarding their proficiency in technical communication in the English language. In terms of mean scores, it was observed that skills in technical communication in English had the lowest ranking (mean=3.41) when compared to knowledge in technical communication (mean=3.42) and attitudes towards communication in English (mean=4.04).

**Table 1** Overall Mean Scores for Student's Perspectives toward Technical Communication Competence

No	Technical Communication Competence	Overall Mean
1	Knowledge	3,42
2	Skills	3,41
3	Attitudes	4,04

Table 2 presented below displays the average results pertaining to the students' perceived proficiency in technical communication skills in the English language. The analysis of students' perspectives on their skills in technical communication in English indicates that items 2 and 4 in the skills section received the lowest mean score (mean=3.27). These items pertain to the students' ability to construct concise objectives for a project, communicate references for a project report accurately, and transfer information effectively between written and oral project reports. However, the analysis of skills in technical communication indicated that items 1, 5, and 6 received the highest mean score (mean = 3.56). This suggests that the students expressed agreement in their ability to construct questionnaire items for a project, collect data using the survey method (questionnaire), and gather research data through interviews. In contrast, the remaining aspects, including the capacity to effectively communicate project reports in the appropriate format, the ability to undertake research-based projects, the skill to formulate interview questions, and the aptitude to interpret data presented in graphs and charts, were found to elicit a moderate level of agreement among the students, as indicated by a mean score of 3.4.

**Table 2** Mean Score for Knowledge in Technical Communication

No	Statements	N	Mean	Std. Dev
1	I know the differences between technical communication and other forms of communication.	85	3,56	0,76
2	I know different types of technical documents (eg: processes, procedures, instructions in user manual, project report)	85	3,27	0,95
3	I know the meaning of specific terminology used in technical communication in railway context.	85	3,47	0,89
4	I know how to speak technical communication with correct grammar and pronunciation	85	3,39	0,78
5	I know how to distinguish between formal and informal English in technical communication	85	3,41	0,97
6	I know how to operate technological tools and present it to my co-workers in English	85	3,44	0,74

Table 3 presents the average results pertaining to students' assessed levels of competence in the field of technical communication. The mean score of 3.24 suggests that students had weaknesses in their ability to communicate effectively in a small group context, as suggested by item 8. In addition, there are two other items, namely item 12 and 13, which exhibit disagreement with the aforementioned statement, as indicated by their mean scores of 3.33 and 3.36, respectively. This finding indicated that the students exhibited deficiencies in their ability to effectively plan and organise oral presentations. However, it should be noted that item 11 exhibits the highest average score (mean = 3.64), indicating that the students possess the ability to collect and arrange pertinent information.

**Table 3** Mean Score for Skills in Technical Communication

No	Statements	N	Mean	Std. Dev
7	I am able to speak in a formal and non-formal communication to customer and co-workers	85	3,35	0,98
8	I am able to share information in small group setting (reporting a problem)	85	3,24	0,92
9	I am able to tackle complains and handle conflict within groups positively	85	3,44	0,95
10	I am able to retrieve relevant information from co-workers or customers	85	3,48	0,88
11	I am able to gather and organize relevant information	85	3,64	0,88
12	I am able to plan and develop the content of oral presentation	85	3,33	0,76
13	I am able to plan introduction and conclusion of oral presentations	85	3,36	0,97

The mean scores of students' perceived attitudes towards technical communication in English are presented in Table 4. The study conducted on Item 15, which examined the level of enjoyment experienced when completing technical communication tasks in English, found that it had the lowest mean score of 3.69. This finding suggests that the students did not derive pleasure from engaging in technical communication in the English language. Based on the data presented in the table, it can be observed that the students exhibited a lack of awareness regarding their inadequacies in effectively describing technical documents in English. This is evident from the mean score of 3.93 obtained for item 14. Furthermore, the students expressed dissatisfaction with the requirement to create oral presentations on technical communication tasks in English (item 16: mean=3.94). Nevertheless, the individuals exhibited a cognizance about the significance of technical communication in the English language for their prospective professional endeavours. Furthermore, they concurred on the significance of technical communication in English within the realm of engineering as indicated by item 17, with a mean score of 4.16.

**Table 4** Mean Score for Attitude towards Technical Communication

No	Statements	N	Mean	Std. Dev
14	I am aware my weaknesses on explaining the technical document in English	85	3,93	0,75
15	I enjoy completing technical communication task	85	3,69	0,72
16	I appreciate the task to compose oral presentation and I do my best to do it.	85	3,94	0,80
17	I am aware the importance of technical communication in English within Railway profession	85	4,16	0,72
18	I need to improve my technical communication in English	85	4,48	0,68

Additionally, the study's findings also indicated that the participants expressed a consensus on the necessity of enhancing their proficiency in technical communication in the English language (mean score of 4.48 for item 18). Therefore, the discovery aligns with the second research purpose, which aims to explore students' perceptions of their technical communication competency needs.

## Discussions

Based on the findings of the research, it was determined that the level of technical communication proficiency in English among polytechnic engineering students ranged from poor to moderate. In terms of knowledge and attitudes in technical communication in English, it was observed that abilities in technical communication in English had the lowest mean score overall. The students' lowest mean score indicates a difficulty in effectively communicating with correct grammar. The assessment of proficiency in technical communication was based on the ability to effectively convey technical information through the use of precise language in written documents. The findings presented in this study offer indirect validation for the research conducted by Md. Yasin et al. (2010) regarding the English language proficiency of polytechnic students in relation to their ability to

comprehend technical documents, employ suitable grammar, vocabulary, and sentence structure, effectively communicate in tests and reports of investigations, and pose clarifying questions. Consequently, our research has revealed that students enrolled in polytechnic engineering programmes, as well as those studying engineering at other technical schools, encounter difficulties in the realm of technical communication.

Among the three technical communication abilities investigated in this study, it is noteworthy that attitudes towards technical communication in English exhibited the highest average scores. For example, the highest average score was obtained by the comprehension of the significance of technical communication in the English language and the pertinence of verbal and written communication in English within the field of engineering. This finding indicated that students pursuing polytechnic engineering education shared the viewpoint that effective communication in technical English was of utmost importance. The findings of the study also indicated that students pursuing engineering degrees at polytechnic institutions have a strong desire to improve their technical communication skills. The findings of this study, however, present a contrasting perspective to the assertion put forth by Warnock and Kahn (2007) that a considerable number of engineering students do not perceive communication as pertinent to their prospective professional trajectories.

#### **4. CONCLUSION**

This study investigated the perceptions of engineering students at a specific polytechnic regarding the importance of acquiring proficiency in English technical communication skills. In general, the findings indicate that students' evaluations of their technical communication skills had the lowest average ratings. The consensus among the students, however, was that there exists a necessity to improve their technical communication abilities, as these skills are deemed crucial for their prospective engineering employment. Based on the findings of this study, it is evident that there is a need for polytechnic engineering students to enhance their proficiency in technical communication. One potential approach to achieve this objective could involve the implementation of supplementary instructional activities within the classroom setting, specifically targeting the enhancement of English technical communication skills. Furthermore, it is recommended that the teaching and learning methods employed, such as the classroom modules, be enhanced by incorporating a greater amount of relevant material specifically tailored to the needs of engineering students.

This has the potential to enhance engineering students' inclination towards technical English communication. It is of merit to examine the present requirements of polytechnic engineering students, as their input can serve as a basis for enhancing the course material that may have been disregarded. This is due to the fact that need analysis is an ongoing procedure aimed at identifying learning needs. Consequently, there is a possibility of incorporating technical communication courses

into the polytechnic education system, rather than integrating them into the syllabus of the Communicative English course as a specific topic or subtopic. The significance of technical communication skills in the engineering sector is the reason behind this. Given the importance of technical communication competency in engineering education, it is desirable that further research be conducted on the demands of technical communication competency among a broader community and across various polytechnics in Indonesia.

## REFERENCES

- CBI. (2013). Changing the pace: CBI/Pearson education and skills survey 2013. London: CBI.
- Chua YP. (2010). Mastering research methods. McGraw-Hill Education, Kuala Lumpur.
- Ding, H. (2018). Development of Technical Communication in China: Program Building and Field Convergence. *Technical Communication Quarterly*, 1-15.
- Ellis, T. J., & Levy, Y. (2010). A Guide for Novice Researchers: Design and Development Research Methods. *Proceedings of Informing Science & IT Education Conference (InSITE)* (pp.107-118). Cassino: Italy.
- Feng, X.-F. (2015). Reform and practice of oral English teaching for Non-English majors in higher vocational colleges -- taking electronic manufacturing industry as an example. *Contemporary education research and teaching practice* (10), 202+201.
- Friess, E., & Boettger, R. K. (2021). Identifying Commonalities and Divergences Between Technical Communication Scholarly and Trade Publications (1996–2017). *Journal of Business and Technical Communication*, 35(4), 407-432. doi: 10.1177/1050651921102146
- Holmes, A., & Miller, S. (2000). A case for advanced skills and employability in higher education. *Journal of Vocational Education & Training*, 52(4), 653-664.
- Jamaludin, K. A., Alias, N., DeWitt, D., & Ibrahim, M. M. (2020). Technical communication pedagogical model (TCPM) for Indonesiann vocational colleges. *Humanities and Social Sciences Communications*, 7(1). <https://doi.org/10.1057/s41599-020-00597-6>
- Keller, S., Parker, C., & Chan, C. (2011). Employability Skills: Student Perceptions of an IS Final Year Capstone Subject. *Innovation in Teaching and Learning in Information and Computer Sciences*, 10(2), 4-15.
- Lappalainen P (2010) Integrated language education—a means of enhancing engineers’ social competences. *Eur J Eng Educ* 35(4):393–403
- Michelle A. Hill, Tina L. Overton, Christopher D. Thompson, Russell R. A. Kitson, Paolo Coppo. (2019) Undergraduate recognition of curriculum-related skill development and the skills employers are seeking. *Chemistry Education Research and Practice* 20:1, pages 68-84.
- Nauta, A., Van Vianen, A., Van der Heijden, B., Van Dam, K., & Willemsen, M. (2009). Understanding the factors that promote employability orientation: The impact of employability culture, career satisfaction, and role breadth self-efficacy. *Journal of Occupational and Organizational Psychology*, 82(2), 233-251.
- Politeknik Perkeretaapian Indonesia Madiun. (2021). *LAPORAN SURVEY KEPUASAN PENGGUNA LULUSAN*. Madiun. <https://alumni.ppi.ac.id/index.php/hasil-tracer-pengguna-lulusan/>



- Rakesh, B, Pushpendra, P, & Mariam, H.A. (2017) Graduate attributes and employability skills. *International Journal of Educational Management* 31:6, pages 814-827.
- Ramayah T, Cheah J, Chuah F, Ting H, Memon MA (2018) Partial least squares structural equation modeling (PLS-SEM) using SmartPLS 3.0: an updated and practical guide to statistical analysis, 2nd edn. Pearson Malaysia Sdn. Bhd., Kuala Lumpur
- Rus, D. (2015). Developing technical communication skills to engineering students. *Procedia Technology*, 19, 1109-1114.
- Saputra, W. S. (2015). Employers' Needs for Employability Skills of Engineering Graduates in Indonesia. *Proceedings of the 3rd UPI International Conference on Technical and Vocational Education and Training*, 14. <https://doi.org/10.2991/ictvet-14.2015.49>
- Shekhawat, S. (2020). Enhancing employability skills of engineering graduates. In *Sustainable Production, Life Cycle Engineering and Management*. [https://doi.org/10.1007/978-3-030-44248-4\\_26](https://doi.org/10.1007/978-3-030-44248-4_26)
- Shivoro, R. S., Shalyefu, R. K., & Kadhila, N. (2018). Perspectives on Graduate Employability Attributes for Management Sciences Graduates. *South African Journal of Higher Education*, 32(1), 216–232. <https://doi-org.proxy.library.adelaide.edu.au/10.20853/32-1-1578>
- Siraj, S., Alias, N. A., DeWitt, D., & Hussin, Z. (2013). Design and Developmental Research: Emergent Trends in Educational Research. Kuala Lumpur, Malaysia: Pearson Malaysia Sdn. Bhd.
- Štemberger, T., Cencič M. (2016). Design Based Research: The Way of Developing and Implementing Educational Innovation. *World Journal on Educational Technology Current Issues* 8(3). DOI:10.18844/wjet.v8i3.621
- Tymon, A. (2013). The student perspective on employability. *Studies in Higher Education*, 38(6), 841. Retrieved from <http://proxy.library.adelaide.edu.au/login?url=https://search-proquest.com.proxy.library.adelaide.edu.au/docview/1411810117?accountid=8203>
- Yang, S., Duan, Q., Ji, T., Li, X., Hu, P., & Yang, Y. (2018). Research on the teaching mode of English majors for manufacturing enterprises. *Guangxi journal of light industry*, 34(01), 149+151.